The following listing of claims will replace all prior versions of claims in the application.

Listing of Claims:

1. (cancelled).

14. (withdrawn).

15. (withdrawn).

16. (withdrawn).

17. (withdrawn).

18. (cancelled).

19. (cancelled).

20. (withdrawn).

21. (new) A method of producing a transgenic, non-human mammal having integrated into its genome a defined segment of DNA, comprising :

a. obtaining a yeast-bacteria shuttle vector comprising a yeast replication origin, a yeast selection marker gene, a bacterial replication origin, a bacterial selection marker gene, at least one unique cloning site, and sequences homologous to sequences flanking the defined segment of DNA, wherein said bacterial replication origin is selected from the group consisting of P1 replicon and F factor origin of replication;

b. linearizing the vector within the homologous sequences to form recombinogenic ends;

c. introducing the linearized vector into a yeast cell containing DNA comprising the defined segment of DNA, wherein the linearized vector and defined segment of DNA homologously recombine to form a recombinant product;

d. selecting for the recombinant product;

e. transferring the recombinant product to bacteria for amplification;

f. isolating the defined segment of DNA from the recombinant product;

g. integrating the defined segment of DNA into the genome of a mammal.

22. (new) The method of claim 21, wherein the defined segment of DNA is mutated by yeast genetics.

23. (new) The method of claim 21, wherein the defined segment of DNA is mutated in bacteria.

24. (new) The method of claim 21, wherein said transgenic mammal is a mouse.

25. (new) The method of claim 21, wherein the yeast-bacteria shuttle vector is pCLASPER.

26. (new) The method of claim 21, wherein the defined segment of DNA is integrated into the genome of the mammal by a method selected from the group consisting of microinjection, chemical transfection, electroporation, and chimera production.

27. (new) A transgenic, non-human mammal made according to claim 21.

28. (new) Cells obtained from the transgenic, non-human mammal of claim 26, wherein said cells contain the defined segment of DNA integrated into the genome of said cells.

29. (new) A method of producing a transgenic, non-human embryo having integrated into its genome a defined segment of DNA, comprising :

a. obtaining a yeast-bacteria shuttle vector comprising a yeast replication origin, a yeast selection marker gene, a bacterial replication origin, a bacterial selection marker gene, at least one unique cloning site, and sequences homologous to sequences flanking the defined segment of DNA, wherein said bacterial replication origin is selected from the group consisting of P1 replicon and F factor origin of replication;

b. linearizing the vector within the homologous sequences to form recombinogenic ends;

c. introducing the linearized vector into a yeast cell containing DNA comprising the defined segment of DNA, wherein the linearized vector and defined segment of DNA homologously recombine to form a recombinant product;

d. selecting for the recombinant product;

e. transferring the recombinant product to bacteria for amplification;

f. isolating the defined segment of DNA from the recombinant product;

g. integrating the defined segment of DNA into a specific site in the genome of embryonic stem cells by homologous recombination;

h. isolating the embryonic stem cells having integrated into their genome the defined segment of DNA;

i. injecting the embryonic stem cells of step (h) into a blastocyst;

j. identifying a transgenic, non-human embryo that has integrated into its genome the defined segment of DNA.

30. (new) The method of claim 29, wherein the defined segment of DNA is mutated by yeast genetics.

31. (new) The method of claim 29, wherein the defined segment of DNA is mutated in bacteria.

32. (new) The method of claim 29, wherein the transgenic, non-human embryo is a mouse embryo.

33. (new) The method of claim 32, further comprising the step of permitting the transgenic mouse embryo to develop into a mouse.

34. (new) A transgenic mouse embryo produced according to the method of claim 29.

35. (new) A transgenic mouse produced according to method claim 29.

36. (new) The transgenic mouse of claim 35, wherein said mouse is a knock-in mouse created by homologous recombination.